TRADE NEWS

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Danish Seining in Canada

Fisheries Research Board Discovers Grounds Suitable For Technique Popular in Europe for Century

AN EXPLORATORY fishing project which drew a virtual blank in Newfoundland but produced good results in the Cape Breton area is described in Bulletin No. 108, one of the latest published by the Fisheries Research Board of Canada.

Prepared by T.N. Stewart of the Board's Biological Station in St. John's, the bulletin describes investigations made by fisheries scientists in 1953-54 to find new grounds for the Danish-seine fishery in Newfoundland. At the conclusion of investigations in this area, the survey was extended to Cape Breton and was successful in locating, in North Bay, an extensive area in which the sea bottom is excellent for this method of fishing, and where large catches of witch flounder and American plaice were made.

INVENTED IN 1848

The Danish seine method of fishing was invented by a fisherman named Jans Vaever in Denmark, in 1848. The technique proved to be so effective that its use spread to other countries of Europe, including the British Isles, and in recent years to Australia, New Zealand and Newfoundland. It is now one of the more important forms of fishing in Europe, employing thousands of fishermen who catch a wide variety of fish.

Danish seining consists of surrounding a large area of sea bed with two very long ropes and a net in such a way that when the ropes are pulled in and the area enclosed by them becomes smaller, the fish on or near the bottom are driven into the centre where they are collected by the moving net. It can be operated successfully only on grounds that are smooth and free of rocks, coral, boulders, etc., and free of strong currents. An outline of the fishing technique, and the net, are shown in Figures 2 and 3.

Actually, there are two forms of Danish seining; anchor fishing and fly-dragging. In the former, the gear is set out from an anchor to which the boat, after laying out the ropes and seine, returns and ties up for hauling the gear. In fly-dragging a buoy is used instead of the anchor and, after the gear has been set out, the boat picks up the buoy and cruises slowly ahead while hauling the seine.

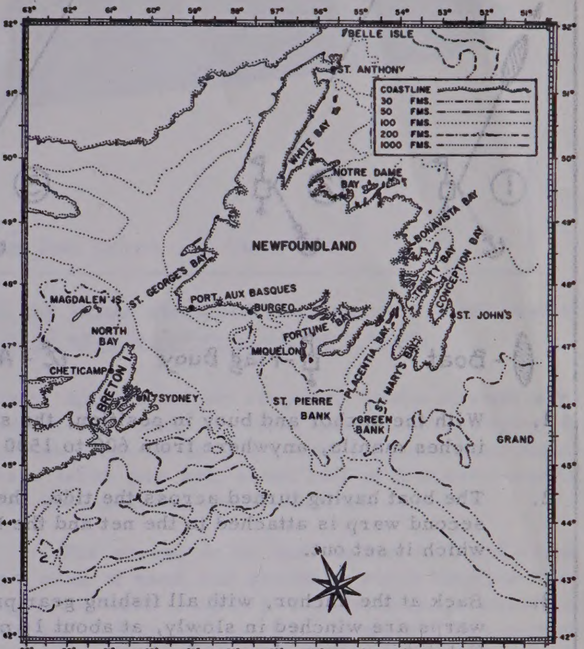

Fig.1 Areas investigated by scientists in a search for new Danish seine fishing grounds off the Newfoundland and Cape Breton coasts.

Danish seining in Canada had its inception in Newfoundland in 1951 when the Provincial Government, operating the newly-built fisheries exploration vessel "Matthew II", conducted investigations to determine if this method of fishing could be employed in Newfoundland waters. A Danish-seine fishing ground for witch flounder or grey sole, Glyptocephalus cynoglossus (Linnaeus), was discovered in Fortune Bay, on the province's south coast, and commercial exploitation began in 1952. Since then as many as seven boats have been equipped for Danish seining, although never more than four, and usually less, have operated at one time on this ground. The fishery is concentrated between Brunette Island and the Burin Peninsula in depths between 90 and 180 fathoms.

The Fisheries Research Board's explorations in 1953 and 1954 were also conducted with the "Matthew II" which was lent for the purpose by the Newfoundland Government. The main object of this survey was to determine if other grounds suitable for Danish seining existed in or near the Newfoundland coastal waters.

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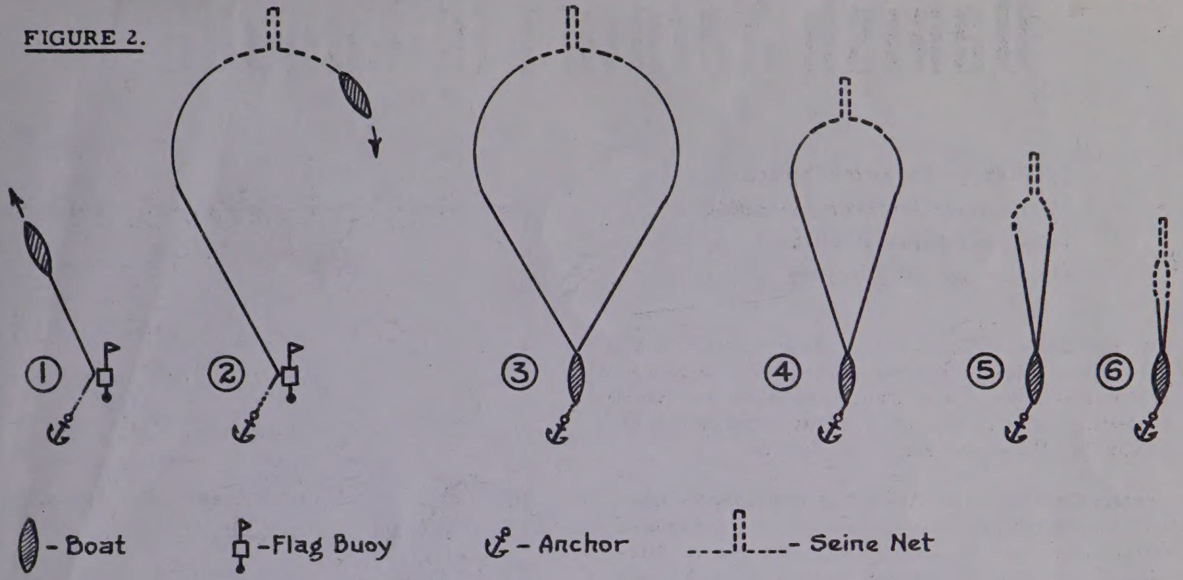
FIGURE 2.



1. With the anchor and buoy in position, the seiner commences laying out a long warp, usually $2\frac{1}{4}$ inches manila, anywhere from 600 to 1500 fathoms long.

2. The boat having turned across the tide, the net is shot away with the wings drawn wide open. A second warp is attached to the net and the boat continues in a wide arc, returning to the buoy from which it set out.

3. Back at the anchor, with all fishing gear properly set out, hauling of the seine commences. The warps are winched in slowly, at about $1\frac{1}{2}$ m.p.h. The action of the rope on the bottom chases the fish into an ever-decreasing area.

4. With one-third of the ropes taken in, the winch is speeded up to about $2\frac{1}{2}$ m.p.h. bringing the net towards the boat. The fish become concentrated in a narrow area and the speed of the winch is increased to 3 to 4 m.p.h.

5. As the net approaches the boat the fish are swept in. Both the ropes and the wings of the net are closing, and when about two-thirds of the rope has come in they are completely closed.

6. The net is winched in at top speed until all the rope has been taken aboard. The net is pulled in by hand and the catch in the cod-end is taken aboard with the tackle.

In preparing for the survey, the scientists made a study of the otter-trawl catches of witch flounder made in previous years by the research vessel "Investigator II", and the most likely areas were selected for investigation. Data obtained by the "Investigator II" was used in charting the probable composition of the sea bed. From this information the more favourable areas were selected for the most intensive work. Where the bottom was suitable the explorations were extended over a range of depths, so that any local concentrations due to temperature could be discovered. Some areas with bottom temperatures apparently too low for witch flounder were included in the investigation in order to discover whether American plaice or Greenland halibut could be fished commercially by Danish seining.

The regions investigated (figure 1) were divided into natural sub-areas according to the type of sea bottom, and the results obtained are detailed separately in the Bulletin. For clarity and brevity, the investigations are dealt with in geographical order, running counter clockwise from the Rose Blanche Bank on the southwest coast, rather than in chronological order.

SOUTH COAST INVESTIGATION

The Rose Blanche bank, at the western end of the south coast, was found to be very rough and uneven. The western slopes were also hard and, although in the deep water the bottom became smoother, it was not soft enough to allow the use of the Danish seine. East of Rose Blanche Bank towards the Burgeo area, the rough slope dipped down

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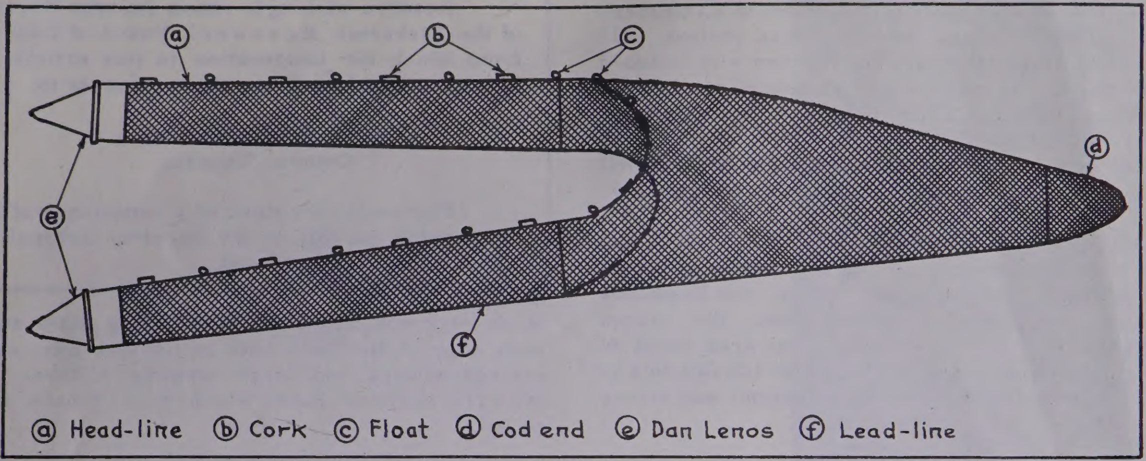

Figure 3. The net used in Danish seining. Set out with the wings stretched wide apart, the net catches fish in a manner similar to that of the otter trawl as it is drawn along the bottom.

to uneven mud banks. In the seven sets attempted in the Rose Blanche Bank area, the gear was caught on the bottom on all but one occasion and only two witch flounder were caught.

Exploratory fishing was conducted in both 1953 and 1954 in the Burgeo, Hermitage Bay, Miquelon area, and a total of nineteen sets were made. This fishing effort, together with the accompanying fathometer survey, show that the coastline and bays are rocky, and the narrow channels are not generally suitable for Danish seining.

A sandy bottom was found in the vicinity of Miquelon and there was an indication of good ground in deep water, over 90 fathoms, but the weather conditions and a very strong current made fishing difficult when the sets were made, October 10-26. One set produced 250 pounds and two others 100 pounds of witch flounder, indicating the possibility that small grounds for Danish seining do exist, although none were found during the survey. Fishing operations here, however, would have to contend with the strong current which prevails for considerable periods.

In Fortune Bay seven sets were made in the existing commercial fish area in order to test the working of the gear and catches were consistent with those obtained by the commercial vessels at the same time. Surveys of a large part of Fortune Bay with the echo-sounder indicated some suitable bottom apart from the commercial ground. However, sets made in the area north of the known fishing ground produced poor results.

In Placentia Bay suitable smooth bottom was found only in the deeper water, 115 to 130 fathoms. In depths less than 115 fathoms the sea bed is rocky and uneven, and south of the bay the water is shallower and the bottom rougher. In the smooth area tested the catch of witch flounder was negligible and although up to 500 pounds of American plaice were taken per set, about half of this catch was of fish too small for commercial use.

The survey in St. Mary's Bay included a bottom area of sand and gravel in which longline fishing boats were reported to have made excellent catches of American plaice. However, this section proved to be too limited to allow the Danish seining gear to be set out clear of obstructing rocks, and attempts to fish these grounds were without success. Other parts of the bay fished also proved unsuitable.

Summing up, the survey of the south coast of Newfoundland did not locate any new fishing grounds for witch flounder. Farther offshore than the regions surveyed there was no reason to expect better results.

EAST COAST OF NEWFOUNDLAND

Fathometer and temperature tests indicated that the most promising areas for Danish seining on the east coast of Newfoundland would be found only in the bays and in an offshore area 50 to 60 miles east of the Northern Peninsula.

Most of the offshore survey was carried out from St. Anthony on a smooth muddy slope from 170 fathoms to 200 fathoms in depth. Although bottom temperatures there appeared favourable, the greatest catch of witch flounder was only twelve pounds while the catch of American plaice was also very low.

In other sections of this general area, the rough, rocky nature of the bottom made Danish seining impractical.

White Bay, which is very deep with a soft mud bottom and steep sides, is the scene of a commercial linetrawl fishery for Greenland halibut. Although the water is very cold, this bay was included in the survey to test the Danish seining method for Greenland halibut. Three sets in 132 to 196 fathoms produced no catches and in two sets in over 200 fathoms it was probable that the net was not fishing on the bottom. There was no suitable shallower water to be found.

Two sets were made in the mouth of Green Bay, which is similar to White Bay, and 35 pounds of witch were taken in one of them. The bottom temperature was very low. A level area south of Horse Islands, varying from 118 to 126 fathoms in depth, was tested but the rough bottom and strong currents made fishing impossible.

Three sets were made in the deep channel in Bonavista Bay and in two of these the gear became hooked up. In the successful set only four pounds of witch flounder and 80 pounds of small American plaice were taken. Tests made off Cape Bonavista indicated that the bottom was too rough for Danish seining.

Extremely poor results were also obtained in Trinity and Conception bays, the best catch being 50 pounds of American plaice caught in the latter bay.

The east coast of Newfoundland did not show any promise for Danish seining. The offshore deep water was the only ground of any extent on which the gear could be used satisfactorily, and the catches there were consistently very poor, although the bottom temperatures were suitable for witch flounder.

GRAND BANK OF NEWFOUNDLAND

The southwest edge of the Grand Bank of Newfoundland was extensively surveyed with 28 sets being made. In only four of these sets did the catch of witch exceed 100 pounds and only two produced good commercial quantities, namely 1,350 and 2,200 pounds. The catches obtained in this area consisted of a variety of species with variable numbers of American plaice, common hake and haddock appearing in most sets.

Tests were also made in the Grand Bank areas known as Whale Deep, Green Bank Gully and Channel Gully but these were unsuccessful.

The sets on the southwest edge of the Grand Bank were made in July and August. Otter trawlers working the same area generally obtain witch in large quantities only during the spring months. The catch of a Danish seiner working this area in spring would probably be excellent, but a larger, more seaworthy boat than the "Matthew II" would be required to exploit the ground at that time of year.

Readers wishing to obtain Bulletin No. 108 of the Fisheries Research Board of Canada from which the information in this article is extracted should address their requests to:

The Queen's Printer
Ottawa, Canada.

For each copy desired a remittance of 50 cents made payable to the Receiver General of Canada should be enclosed.

More work would be entailed in fishing on the southwest edge of the bank than in Fortune Bay, as the catches always had large amounts of trash fish, mostly common hake, which would have to be culled.

Danish seining would be possible in the southwest Grand Bank area, but because of the extra distance from port, and the larger size of vessel required to fish the ground in safety, it would not be economical while catches in Fortune Bay are high.

NORTH BAY, GULF OF ST. LAWRENCE

As mentioned previously, the investigations carried out in North Bay, in the Gulf of St. Lawrence west of Cape Breton Island, had excellent results. Near the shore there is a deep channel, the western side of which sloped gradually upwards to the Magdalen Islands. The sea bottom on this slope is smooth and consists of fine red sand. In the region between 46°20'N. and 46°55'N., and 61°09'W. and 61°42'W. a large area of sea bottom suitable for Danish seining was found. Five sets made in this area, in depths between 32 and 37 fathoms, produced excellent catches, varying from 4,000 to 9,000 pounds of witch flounder and American plaice.

The witch flounder catches were from 1,000 to 3,000 pounds for each set, and these fish were large and of good quality. American plaice made up the bulk of the catches, as much as 7,000 pounds to one set, and were mainly fish of good commercial size. Small amounts of scrod and small market cod were also caught.

North of the area the sea bottom became harder. Similarly, two sets made in Sydney Bight, northeast of Cape Breton Island, showed that the ground was too rough and the tidal currents too strong for the gear to function properly.

Summarizing the results obtained in North Bay, the Bulletin states that it contains an extensive area in which the sea bottom is excellent for Danish seining, and where very large catches of witch flounder and American plaice were made during October, 1954. Although otter trawlers were working the same area their catches per set were much smaller. ✔

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